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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,500	12/03/2003	Joseph F. Brooks	M4065.0957/P957	3970
45374	7590	07/25/2007		
DICKSTEIN SHAPIRO LLP 1825 EYE STREET, NW WASHINGTON, DC 20006			EXAMINER HOANG, QUOC DINH	
			ART UNIT 2818	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/725,500

Applicant(s)

BROOKS ET AL.

Examiner

Quoc D. Hoang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-59 is/are pending in the application.
- 4a) Of the above claim(s) 30-59 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Amendment*

1. Amendment filed on 09/15/2006 has been entered. In Amendment, claims 1-20 have been cancelled. Claims 21-59 are pending in the application.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 21-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Applicants' Admitted Prior Art (AAPA).

**Regarding claim 21**, AAPA teaches an electrode structure, comprising:

a first conductive layer (102) ([0025]-[0029] and Fig. 2);

a dielectric layer (104) over said first conductive layer, said dielectric having an opening exposing a portion of said first conductive layer ([0025]-[0029] and Fig. 2);

an adhesion layer (110) in said opening in said dielectric layer and over said exposed portion of said first conductive layer ([0025]-[0029] and Fig. 2);

a second conductive layer (112) formed at least partially over said adhesion layer, wherein said second conductive layer and said adhesion layer are recessed within said opening in said dielectric layer ([0025]-[0029] and Fig. 2); and

a third conductive layer (210) formed over and at least partially in contact with said second conductive layer and said adhesion layer within said opening ([0025]-[0029] and Fig. 2). Noted that the third conductive layer could be in electrical contact with the second conductive layer through the memory layer (200) formed in between the first and second conductive layer (see Fig. 2).

**Regarding claim 22**, AAPA teaches wherein said third conductive layer 210 is planarized such that a top surface of said layers is substantially level with a top surface of said dielectric layer ([0025]-[0029] and Fig. 2).

**Regarding claim 23**, AAPA teaches wherein said third conductive layer 210 is patterned ([0025]-[0029] and Fig. 2) .

**Regarding claim 24**, AAPA teaches wherein said adhesion layer 110 comprises an oxide or a nitride ([0025] and Fig. 2).

**Regarding claim 25**, AAPA teaches wherein said adhesion layer 110 comprises titanium nitride ([0025] and Fig. 2).

**Regarding claim 26**, AAPA teaches wherein said first conductive layer 102 comprises at least one of the group consisting of tungsten, nickel, tantalum, aluminum, platinum, and conductive nitrides ([0025] and Fig. 2).

**Regarding claim 27**, AAPA teaches wherein said second conductive layer 112 comprises tungsten ([0025] and Fig. 2).

4. Claims 21-26 and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Yang et al (US Pat No. 6,734,559 hereinafter "Yang").

**Regarding claim 21**, Yang teaches an electrode structure, comprising:

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a first conductive layer (210);

a dielectric layer (226) over said first conductive layer, said dielectric having an opening exposing a portion of said first conductive layer;

an adhesion layer (221) in said opening in said dielectric layer and over said exposed portion of said first conductive layer;

a second conductive layer (201) formed at least partially over said adhesion layer, wherein said second conductive layer and said adhesion layer are recessed within said opening in said dielectric layer; and

a third conductive layer (208) formed over and at least partially in contact with said second conductive layer and said adhesion layer within said opening (col. 4, lines 9-48 and Fig. 5). Noted that the third conductive layer could be in electrical contact with the adhesion layer through the seed (222) (see Fig. 5).

**Regarding claim 22**, Yang teaches wherein said third conductive layer is planarized such that a top surface of said layers is substantially level with a top surface of said dielectric layer (col. 4, lines 9-48 and Fig. 5).

**Regarding claim 23**, Yang teaches wherein said third conductive layer is patterned (col. 4, lines 9-48 and Fig. 5).

**Regarding claim 24**, Yang teaches wherein said adhesion layer comprises an oxide or a nitride (col. 4, lines 9-48 and Fig. 5).

**Regarding claim 25**, Yang teaches wherein said adhesion layer comprises titanium nitride (col. 4, lines 9-48 and Fig. 5).

**Regarding claim 26**, Yang teaches wherein said first conductive layer comprises at least one of the group consisting of tungsten, nickel, tantalum, aluminum, platinum, and conductive nitrides (col. 4, lines 9-48 and Fig. 5).

**Regarding claim 28**, Yang teaches wherein said third conductive layer is formed from a same material as the first conductive material (col. 4, lines 9-48 and Fig. 5).

5. Claims 21-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Young., (US Pat No. 7,074,709)

**Regarding claim 21**, Young teaches an electrode structure, comprising:

- a first conductive layer (30);
- a dielectric layer (35) over said first conductive layer, said dielectric having an opening exposing a portion of said first conductive layer;
- an adhesion layer (36) in said opening in said dielectric layer and over said exposed portion of said first conductive layer;
- a second conductive layer (34) formed at least partially over said adhesion layer, wherein said second conductive layer and said adhesion layer are recessed within said opening in said dielectric layer; and
- a third conductive layer (38) formed over and at least partially in contact with said second conductive layer and said adhesion layer within said opening (col. 6, line 23 through col. 7, line 32 and Fig. 6). Noted that the third conductive layer (38) could be in electrical contact with the adhesion layer (36) through the seed (46) (see Fig. 6).

**Regarding claim 22**, Young teaches wherein said third conductive layer is

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planarized such that a top surface of said layers is substantially level with a top surface of said dielectric layer (col. 6, line 23 through col. 7, line 32 and Fig. 6).

**Regarding claim 23,** Young teaches wherein said third conductive layer is patterned (col. 6, line 23 through col. 7, line 32 and Fig. 6).

**Regarding claim 24,** Young teaches wherein said adhesion layer comprises an oxide or a nitride (col. 6, line 23 through col. 7, line 32 and Fig. 6).

**Regarding claim 25,** Young teaches wherein said adhesion layer comprises titanium nitride (col. 6, line 23 through col. 7, line 32 and Fig. 6).

**Regarding claim 26,** Young teaches wherein said first conductive layer comprises at least one of the group consisting of tungsten, nickel, tantalum, aluminum, platinum, and conductive nitrides (col. 6, line 23 through col. 7, line 32 and Fig. 6).

**Regarding claim 27,** Young teaches wherein said second conductive layer comprises tungsten (col. 6, line 23 through col. 7, line 32 and Fig. 6).

**Regarding claim 28,** Young teaches wherein said third conductive layer is formed from a same material as the first conductive material (col. 6, line 23 through col. 7, line 32 and Fig. 6).

**Regarding claim 29,** Young teaches wherein said third conductive layer is formed from a same material as the second conductive material (col. 6, line 23 through col. 7, line 32 and Fig. 6).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' Admitted Prior Art in view of Young., (US Pat No. 7,074,709).

**Regarding claim 28**, AAPA teaches the third conductive layer (210), but does not teach wherein said third conductive layer is formed from a same material as the first conductive material.

However, Young teaches wherein the third conductive layer (38) is formed from a same material as the first conductive material (30) (col. 7, lines 20-22 and Fig. 6). Since AAPA and Young are all from the same field of endeavor, the purpose disclosed by Young would have been recognized in the pertinent art of AAPA. It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to use same conductive material of the first and third conductive layer in order to obtain a high conductivity of the interconnects.

**Regarding claim 29**, AAPA teaches the third conductive layer (210), but does not teach wherein said third conductive layer is formed from a same material as the second conductive material.

However, Young teaches wherein the third conductive layer (38) is formed from a same material as the second conductive material (34) (col. 7, lines 20-22 and Fig. 6). Since AAPA and Young are all from the same field of endeavor, the purpose disclosed by Young would have been recognized in the pertinent art of AAPA. It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to



use same conductive material of the first and second conductive layer in order to obtain a high conductivity of the interconnects.

***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quoc Hoang whose telephone number is (571) 272-1780. The examiner can normally be reached on Monday-Friday from 8.00 AM to 5.00 PM.


If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571) 272-1657. The fax phone numbers of

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the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and (571) 273-8300 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Quoc Hoang  
Patent examiner/AU 2818

  
07/21/2008

**QUOC D. HOANG**  
**PRIMARY PATENT EXAMINER**